Name _____ Date _____ Period _____

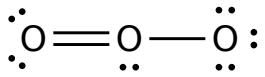
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2.6 Resonance and Formal Charge

AP Chemistry

Formal charge: FC = V − N − ½B (valence electrons − nonbonding electrons − half the bonding electrons). Show all lone pairs.

1. One Lewis structure for ozone, O_3, is shown. Calculate the formal charge on each oxygen atom, then check that they add up to the overall charge.



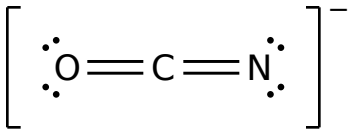
2. Draw both resonance structures for the formate ion, HCO_2^- (C is central and bonded to H and both O atoms). What is the average C–O bond order?

3. Draw all resonance structures for the nitrate ion, NO_3^-. All three N–O bonds in nitrate have the same length. Explain why, and give the average bond order.

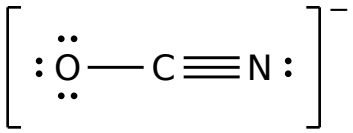
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4. Three possible Lewis structures for the cyanate ion, OCN^-, are shown. Assign formal charges to every atom, then choose the best structure and justify your choice.

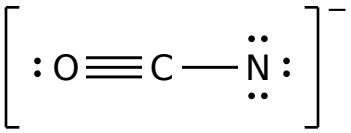
A



B



C



5. Rank the N–O bonds in NO^+, NO_2^-, and NO_3^- from **shortest** to **longest**. Justify your ranking with bond order.

6. Chlorine dioxide, ClO_2, is used to treat drinking water. Explain why no Lewis structure of ClO_2 can have every electron paired.

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